

REMARKS/ARGUMENTS

Claims 1-20 were pending in this application. According to the October 6, 2005 Office Action, claims 1-3, 9-12, and 14-19 were rejected and claims 4-8, 13, and 20 were objected to. Applicants have amended claims 4, 17, and 20. Accordingly, claims 1-20 are under consideration. Applicants maintain that the amendments do not introduce any new matter.

Amendment to Claim 17

Previously presented claim 17 recited “securing the ring to the base portion.” Applicants note that there is no antecedent basis for “the ring” and that such recitation by claim 17 is a typographical error. Accordingly, applicants have amended claim 17 to recite “securing the perimeter wall to the base portion,” thereby correcting the typographical error.

Claims 4-8, 13, and 20 Indicated as Allowable

Applicants note with appreciation that the Examiner has indicated that claims 4-8, 13, and 20 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In response thereto, applicants have amended claim 4 to be an independent claim that includes the limitations of independent claim 1 and dependent claim 3. Claims 5-8 and 13 continue to depend from claim 4.

In addition, applicants have also amended claim 20 to be an independent claim that includes the limitations of independent claim 17 and dependent claim 18. Applicants note that in amending claim 20 to include the limitations of claim 17, applicants have amended the limitations of claim 17 to recite “the perimeter wall” rather than “the ring”, as described above. In addition, applicants note that previously presented claim 20 recited “the annular ring,” which recitation lacks antecedent basis and is a typographical error. Accordingly, applicants have further amended claim 20 to recite “the perimeter wall” rather than “the annular ring,” thereby correcting the typographical error.

Rejection of Claims 1-3, 9, and 17 over Spitz in view of Lebby

The Examiner rejected previously presented claims 1-3, 9, and 17 as unpatentable, 35 U.S.C. 103(a), over Spitz et al., patent 6,060,776, May 9, 2000 (hereinafter Spitz) in view of

Lebby et al., patent 5,838,703, November 17, 1998 (hereinafter Lebby). Beginning with claim 1, it recites in part,

[a] semiconductor device package, comprising a base portion, a semiconductor die ..., a perimeter wall snap fitted to the base portion and an encapsulant filling at least a portion of the space within the perimeter wall and encapsulating the die

The Examiner indicated that Spitz Figure 1 shows a device package 100 that is similar to the device package recited by claim 1 and that includes a base portion 3, a perimeter wall 12, and an encapsulant 13 filling at least a portion of the space within the perimeter wall 12 and encapsulating die 4. The Examiner further indicated, however, that Spitz does not teach that perimeter wall 12 is snap fitted to base portion 3. Here, the Examiner indicated that Lebby Figure 1 shows a device package with a perimeter wall 30 snap fitted to a base portion 21 and that it would be obvious to one of ordinary skill in the art to incorporate the teachings of Lebby to the device package of Spitz to have the perimeter wall 12 of Spitz snap fitted to base portion 3. Applicants respectfully disagree for several reasons.

First, applicants respectfully submit that contrary to the Examiner's assertion, Lebby does not teach or suggest a "perimeter wall snap fitted to the base portion," as recited by claim 1, and as such, the combination of Spitz and Lebby also fails to teach or suggest a "perimeter wall snap fitted to the base portion." Specifically, as shown in Lebby Figure 1, Lebby teaches a package 10 for a laser chip 13. Package 10 includes a TO-can type package 12, which houses the laser chip 13. Package 12 includes a base 20, sidewalls 21 secured to the base, and a cover 25 secured to the sidewalls. Lebby teaches that package 10 also includes a lens 18 for laser beam focusing. As described by Lebby, lens 18 has a side support ring 30 that snap fits to sidewalls 21 of package 12.

Notably, the Examiner equated side support ring 30 of lens 18 to the perimeter wall of claim 1. Applicants respectfully submit, however, that side support ring 30 and the perimeter wall of claim 1 are different elements and that one does not teach or suggest the other. Specifically, claim 1 recites "a perimeter wall snap fitted to the base portion and an encapsulant filling at least a portion of the space within the perimeter wall and encapsulating the die." Lebby teaches that package 12 "completely enclose[s] and protect[s]" laser chip 13. (Lebby column 4, lines 60-66). While Lebby does not appear to teach the use of an encapsulant, applicants submit

that if such an encapsulant were included, it would fill the space within sidewalls 21 of package 12. The encapsulant would not fill the space within side support ring 30 of lens 18, which is simply a lens that provides laser beam focusing. Hence, applicants submit that the equivalent element of the “perimeter wall” of claim 1 appears to be sidewalls 21 of package 12 and not side support ring 30. Accordingly, while side support ring 30 of lens 18 may snap fit to device package 12, the side support ring is completely different from and fails to teach or suggest “a perimeter wall snap fitted to the base portion” as recited by claim 1. In addition, as shown in Lebby Figure 1, sidewalls 21 are also not snap fitted to base 20. As such, sidewalls 21 also fail to teach or suggest a “perimeter wall” as recited by claim 1.

Hence, Lebby fails to teach or suggest a “perimeter wall snap fitted to the base portion,” contrary to the Examiner’s assertion. As such, because neither Spitz nor Lebby teaches “a perimeter wall snap fitted to the base portion,” the combination of Spitz and Lebby also fails to teach or suggest “a perimeter wall snap fitted to the base portion,” as recited by claim 1.

Second, applicants also submit that there is no motivation to modify the device package of Spitz in view of Lebby, as indicated by the Examiner. Specifically, the Examiner equated Lebby side support ring 30 to Spitz wall 12 and indicated that it would be obvious to modify Spitz wall 12 to be snap fitted to base 3 in view of Lebby side support ring 30. Applicants respectfully disagree. In particular, Lebby side support ring 30 is completely divergent from and is not related to Spitz wall 12. Spitz wall 12 retains encapsulant 13, which protects chip 4. On the contrary, Lebby side support ring 30 is part of a lens 18, which provides laser beam focusing, and no where does Lebby teach or suggest that side support ring 30 retains encapsulant. Accordingly, because Lebby side support ring 30 is different from Spitz wall 12 there is no suggestion or motivation in Spitz or Lebby to modify Spitz wall 12 in view of Lebby side support ring 30.

Applicants also respectfully submit that contrary to the Examiner’s assertion, the equivalent element of Spitz wall 12 appears to be Lebby sidewalls 21 and not side support ring 30. Accordingly, if one were to modify Spitz wall 12 in view of Lebby, such modification would be in view of Lebby sidewalls 21. However, sidewalls 21 are not snap fitted to base 20. As such, there is no suggestion or motivation to modify Spitz wall 12 to be snap fitted to base 3 in view of Lebby sidewalls 21.

Hence, for the foregoing reasons, Spitz and Lebby fail to teach or suggest claim 1, in addition to claims 2-3 and 9, which depend therefrom.

Turning to amended claim 17, it recites in part,

[a] semiconductor device package, comprising a base portion comprising ... a sidewall ..., a portion of the sidewall defining a recessed portion; a semiconductor die ...; a perimeter wall including a lip extending inwardly from the perimeter wall such that the lip is capable of being snapped into the recessed portion of the base portion, securing the perimeter wall to the base portion; and an encapsulant filling at least a portion of the space within the perimeter wall, encapsulating a portion of the lead and the die.

The Examiner rejected claim 17 for reasons similar to claim 1. Claim 17 recites limitations similar to claim 1 and is therefore novel and nonobvious in view of Spitz and Lebby for the same reasons as set forth above for claim 1.

Rejection of Claims 10-11 over Spitz and Lebby and in further view of Wasmer

The Examiner rejected previously presented claims 10-11 as unpatentable, 35 U.S.C. 103(a), over Spitz and Lebby and in further view of Wasmer et al., patent 5,005,069, April 2, 1991 (hereinafter Wasmer). Claims 10 and 11 depend from claim 9 and thereby from claim 1. The Examiner indicated that the combination of Spitz and Lebby teach the limitations of claim 9, but not the limitations of claims 10 and 11. Here, the Examiner indicated that Wasmer teaches the limitations of claims 10 and 11 and that it would be obvious to one of ordinary skill in the art to combine the teachings of Wasmer with the teachings of Spitz and Lebby.

Because claims 10 and 11 recite the limitations of claim 9 and thereby claim 1 and because Spitz and Lebby fail to teach or suggest the limitations of claim 1, the combination of Spitz, Lebby, and Wasmer also fails to teach or suggest claims 10 and 11 for the same reasons as set forth above for claim 1.

Rejection of Claim 12 over Spitz, Lebby, and Wasmer and in further view of Yoshinaga

The Examiner rejected previously presented claim 12 as unpatentable, 35 U.S.C. 103(a), over Spitz, Lebby, and Wasmer and in further view of Yoshinaga et al., patent 5,886,403, March 23, 1999 (hereinafter Yoshinaga). Claim 12 depends from claim 11. The Examiner indicated

that Spitz, Lebby, and Wasmer teach the device package as recited by claim 11, that Yoshinaga teaches the limitations of claim 12, and that it would be obvious to combine the teachings of Yoshinaga with Spitz, Lebby, and Wasmer. Applicants respectfully disagree.

Specifically, referring to Spitz Figure 1, the Examiner indicated that Spitz teaches a lead 8 having a lower portion 7, coupled to the top electrode of chip 4, and a stem portion joined to the lower portion 7, as similarly recited by claim 9 from which claim 12 depends. However, the Examiner also indicated that Spitz does not teach that the stem portion and lower portion are “joined by capacitance discharge soldering using an eutectic solder,” as recited by claim 12. Here, the Examiner appeared to indicate that Yoshinaga teaches a lead 173 with a lower portion 173a joined to a stem portion, as shown in Yoshinaga Figure 2. The Examiner further indicated that Yoshinaga teaches at column 4, lines 14-17 that the stem portion and lower portion 173a are “joined by capacitance discharge soldering using an eutectic solder” and that it would be obvious to combine the teachings of Yoshinaga with Spitz, thereby teaching claim 12.

Applicants respectfully submit that at Yoshinaga column 4, lines 14-17, Yoshinaga only teaches that chip 170 is soldered to mount 171c with solder 172 and that lower portion 173a of lead 173 is soldered to the upper surface of chip 170 with solder 174. Yoshinaga does not teach or suggest at column 4, lines 14-17 that lower portion 173a is soldered to the stem, let alone that lower portion 173a and the stem are “joined by capacitance discharge soldering using an eutectic solder,” as claim 12 recites.

As such, because Yoshinaga fails to teach or suggest the limitations of claim 12, the combination of Spitz, Lebby, Wasmer, and Yoshinaga also fails to teach or suggest claim 12.

Rejection of Claim 14 over Spitz and Lebby and in further view of Barnett

The Examiner rejected previously presented claim 14 as unpatentable, 35 U.S.C. 103(a), over Spitz and Lebby and in further view of Barnett et al., patent 6,541,800, April 1, 2003 (hereinafter Barnett). Claim 14 depends from claim 3 and recites that “the perimeter wall is comprised of a composite material formed into an annular shape.” The Examiner indicated that Spitz and Lebby teach the limitations of claim 3 but not the limitations of claim 14. Here, the Examiner indicated that Barnett shows in Figure 3 a lens 18 that has a perimeter wall comprised of a composite material formed into an annular shape and that it would be obvious to incorporate

the teachings of Barnett to the device package of Spitz and Lebby. Applicants respectfully disagree.

Specifically, Barnett shows in Figure 3 an LED package 10 with a lens 18 that is formed from a composite material. The Examiner appeared to indicate that it would be obvious in view of Barnett lens 18 to form Spitz wall 12 of a composite material formed into an annular shape because the composite material of lens 18 would allow “for easier formation of [the] annular shape.” First, applicants are not able to determine where Barnett teaches that the material from which lens 18 is formed allows for the easier formation of a shape, such as an annular shape. Second, Spitz wall 12 is not a lens for an LED and is not related to a lens. Accordingly, applicants respectfully submit that there is no suggestion or motivation to modify Spitz wall 12 in view of Barnett lens 18 and that claim 14 is thereby nonobvious in view of Spitz, Lebby and Barnett.

Rejection of Claim 18 over Spitz and Lebby and in further view of Barnett

The Examiner rejected previously presented claim 18 as unpatentable, 35 U.S.C. 103(a), over Spitz and Lebby in further view of Barnett. Claim 18 depends from claim 17 and recites that “the base portion further comprises a threaded extension, and the threaded extension extends in a direction normal to the lower surface.” The Examiner indicated that Spitz and Lebby teach the limitations of claim 17 but not the limitations of claim 18. Here, the Examiner indicated that Barnett shows in Figure 9A a threaded extension as recited by claim 18 and that it would be obvious to incorporate the teachings of Barnett to the device package of Spitz and Lebby because such an extension would “enable the connection to the complementary structure in the package.” Applicants respectfully disagree.

Specifically, as shown in Spitz Figure 1, Spitz is directed at a press-fit rectifier diode 100 that includes a press-fit base 2 with a lower surface 1, a lead 8, and a chip 4 in electrical contact with base 2 and lead 8. Press-fit base 2 and lead 8 provide access to opposing electrodes of chip 4. As shown in Spitz Figure 3, a press-fitting die 35 is used to exert a force against lower surface 1 of press-fit base 2 in order to press-fit the diode 100 into rectifier arrangement 36. Once seated, region 11 of press-fit base 2 provides electrical contact between chip 4 and the rectifier arrangement 36.

Contrary to the Examiner’s assertion, applicants respectfully submit that there is no

suggestion or motivation to add a threaded extension to lower surface 1 of press-fit base 2 of diode 100. First, diode 100 is specifically designed as a press-fit diode in which contact to chip 4 is to occur through region 11 and wire 8. As such, the addition of a threaded extension to lower surface 1 adds no benefit and is contrary to the teachings of Spitz.

Second, applicants submit that the addition of a threaded extension to the lower surface 1 of press-fit base 2 would render diode 100 unsatisfactory for its intended purpose. Specifically, the addition of a threaded extension would hinder press-fitting die 35 from being used to exert a force against lower surface 1 in order to press-fit the diode 100 into rectifier arrangement 36. As such, there is no suggestion or motivation to add a threaded extension. (see MPEP §2143.01).

Accordingly, for the foregoing reasons, applicants respectfully submit that the combination of Spitz, Lebby, and Barnett fails to teach or suggest claim 18.

Rejection of Claim 19 over Spitz and Lebby and in further view of Barnett

The Examiner rejected previously presented claim 19 as unpatentable, 35 U.S.C. 103(a), over Spitz and Lebby and in further view of Barnett. Specifically, claim 19 depends from claim 17 and recites that “the perimeter wall is annular and the recessed portion is a radially cylindrical groove.” The Examiner appeared to indicate that Spitz and Lebby teach a device package as recited by claim 17, that Barnett further shows in Figure 9A the limitations of claim 19, and that it would be obvious to modify the device package of Spitz and Lebby in view of Barnett Figure 9A, thereby teaching claim 19. Applicants respectfully disagree.

Specifically, assuming Spitz and Lebby teach the device package of claim 17, claim 17 recites that the package has “a perimeter wall including a lip extending inwardly from the perimeter wall such that the lip is capable of being snapped into the recessed portion of the base portion.” Notably, Barnett Figure 9A does not teach or suggest such a configuration. Rather, Barnett Figure 9A shows an LED package with a lens 18 secured to a lead frame through a combination of barbs 30 and openings 31, as further shown in Barnett Figure 3. Arguably, the combination of lens 18 and the lead frame of Barnett Figure 9A show a “perimeter wall” that is annular and a “recessed portion” that is a radially cylindrical groove, as claim 19 recites. However, applicants respectfully submit that there is no suggestion or motivation to combine such teachings of Barnett with a device package as recited by claim 17 when the underlying structures as recited by claim 17 and as shown in Barnett Figure 9A are

inherently different.

Accordingly, applicants respectfully submit that the combination of Spitz, Lebby, and Barnett fails to teach or suggest claim 19.

Rejection of Claims 15-16 over Spitz, Lebby, and Barnett and in further view of Kagi

The Examiner rejected previously presented claims 15-16 as unpatentable, 35 U.S.C. 103(a), over Spitz, Lebby, and Barnett and in further view of Kagi et al., patent 6,821,613, November 23, 2004 (hereinafter Kagi). Beginning with claim 15, it depends from claim 14 and recites that the perimeter wall is comprised of a “polyphenylsulfide reinforced by glass fibers.” The Examiner indicated that Spitz, Lebby, and Barnett teach the limitations of claim 14 but do not teach a perimeter wall comprised of a “polyphenylsulfide reinforced by glass fibers.” Here, the Examiner indicated that Kagi teaches at column 12, lines 20-28 a composite material of polyphenylsulfide reinforced by glass fibers and that it would be obvious to incorporate the teachings of Kagi to the device package of Spitz, Lebby, and Barnett. Applicants respectfully disagree.

Specifically, Kagi teaches a material that includes polyphenylsulfide and glass fibers. The Examiner appeared to indicate that it would be obvious in view of Kagi to form Spitz wall 12 of polyphenylsulfide and glass fibers “to improve the structural strength” of Spitz wall 12. First, applicants are not able to determine where Spitz teaches or suggests the need to improve the “structural strength” of wall 12. Second, Kagi teaches that possible applications of the polyphenylsulfide and glass fiber material are vehicle cabins, chassis components, transport containers, sports implements, etc (Kagi, column 1, lines 42-45). However, neither Kagi nor Spitz appears to teach or suggest that a possible application of such a material is a press-fit rectifier diode, as taught by Spitz. Accordingly, applicants respectfully submit that there is no suggestion or motivation to combine the teachings of Kagi with that of Spitz, Lebby, and Barnett and that Spitz, Lebby, Barnett, and Kagi thereby fail to teach or suggest claim 15, in addition to claim 16, which depends therefrom.

Conclusion

Since Spitz, Lebby, Barnett, Yoshinaga, Wasmer, and Kagi, alone or in combination, fail to teach or suggest applicants’ invention as now set forth in claims 1-3, 9-12, and 14-16 and amended claims 17-19, applicants submit that these claims are clearly allowable. Favorable

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